REMARKS:

Applicant has carefully studied the nonfinal Examiner's Action faxed May 30, 2003, and all references cited therein. The following explanatory remarks are believed to be fully responsive to the Action. Accordingly, this important patent application is now believed to be in condition for allowance.

Applicant responds to the outstanding Action by centered headings that correspond to the centered headings employed by the Office, to ensure full response on the merits to each finding of the Office.

Claim Rejections – 35 U.S.C. § 103

Applicant acknowledges the quotation of 35 U.S.C § 103(a).

Claims 1-4, 8, 12-13, 17-20, 30-33, 37, 41, 42, 46 and 47-49 stand rejected under 35 U.S.C § 103(a) as being unpatentable over Ogami (U.S. Patent No. 6,430,171) in view of Fertner (U.S. Patent No. 6,185,251).

Regarding claims 1-4, the Office contends that Ogami discloses in the abstract, an improved initialization method for a communication system comprising the step of, estimating a timing offset utilizing correlation with an entire received DMT frame. Applicant respectfully traverses the finding of the Office.

Claim 1 of the present invention claims an improved initialization method for a communication system comprising the steps of estimating a timing offset utilizing correlation with an entire received DMT frame. Looking to the specification, paragraph [0006] describes the use of DMT technology to provide an Orthogonal Frequency Division Multiplexing (OFDM) solution when employed in a wired environment. As described in the specification and cited references, OFDM and DMT take a broadband data pipe and distribute it among many parallel bins, the number of bins being a function of the Fast Fourier Transform (FFT) size. These bins are then modulated by the Inverse Fast Fourier Transform (IFFT). This signal, containing a bank of narrow-band carriers, is then upconverted, amplified, and sent via the communication channel.

The receiver then demodulates the signal via the FFT and estimates the timing offset and the channel impulse response. As such, estimating the timing offset utilizing correlation with an entire received DMT frame as claimed by the present invention, includes the limitation that a DMT frame be received. As described in the specification at paragraph [0044] a DMT frame comprises a number of samples. In a quadrature amplitude modulation (QAM) scheme, these samples are QAM modulated symbols each centered around a separate center frequency. In other words, the DMT frame comprises data symbols.

By contrast, Ogami describes the determination of an off-set timing for a Code Division Multiple Access (CDMA) system. As known in the art, CDMA systems require all users to share a common bandwidth and signature sequence on a contention basis. Multiple access is achieved by the simultaneous acquisition of different users' spread spectrum transmission as described by Ogami at col. 1, lines 28-40. The CDMA system described by Ogami does not estimate the timing offset utilizing correlation with an entire received DMT frame. Ogami describes at col. 3, lines 29-38, a synchronizing circuit 22 for obtaining correlation between a data stream (or a signal frame) received from the received data accumulating memory 21 and a predetermined spread code SW (synchronization word) which is provided for detecting synchronism establishment, and outputting an obtained correlation value. As such, Ogami describes utilizing correlation between a data stream (or a signal frame), which is not equivalent to a DMT frame, and a predetermined spread code SW (synchronization word).

Additionally, Ogami describes a correlation process to determine off-set timing for a Code Division Multiple Access system. By, contrast the present invention describes a correlation process for use with a Discrete Multitone System. The DMT frame employed in the present invention is not operative with the CDMA system described by Ogami. Ogami does not describe utilizing correlation with an entire received DMT frame, but instead describes a method employed in a CDMA system which inherently utilizes a spreading code.

Regarding claim 8, the Office contends that Fertner discloses the step of estimating the channel impulse response utilizing a maximum mean-square error (MMSE) criterion through the pilot tones at col. 14, lines 19-49. The Office further contends that Fertner discloses a step of estimating a channel impulse response utilizing at least one pilot tone, wherein the received

DMT frame further comprises the at least one pilot tone at col. 2, lines 24-57. Applicant respectfully traverses the finding of the Office.

Fertner describes a procedure for determining the time domain equalizer coefficients for an equalizer, where the equalizer compensates the received signals that are distorted by passing through the channel. As described by Fertner, a unit pulse is transmitted over the communications channel, and a channel impulse response is estimated from the received signal. A cost function establishes a mean-square error associated with the unequalized channel impulse response as compared to a desired impulse response signal. The unit pulse described by Fertner is not equivalent to the pilot tone disclosed by the present invention. Fertner describes the transmission of a unit pulse and the analysis of the received signal resulting from the transmitted unit pulse. As shown in Fig. 6 of Fertner, the unit pulse is transmitted and the amplitude of the pulse is sampled over time. With this method Fertner is able to provide the coefficients for a time-domain equalizer (TEQ) to shorten the effective length of the channel impulse response which effects all the DMT tones, without regard to the transmission frequency.

By contrast, the present invention discloses at paragraph [0047] the transmission of known QAM symbols over certain pilot tones. These QAM symbols are transmitted within the DMT frame used for the timing offset estimation as claimed. The transmission and receipt of the pilot tones provides an estimate of the channel on a per tone basis allowing the implementation of a frequency-domain equalizer (FEQ) for each tone enabling optimization of the signal-to-noise ratio and hence the bit rate. As state is paragraph [0051] of the present invention, the implementation of FEQ can efficiently compensate for channel attenuation and phase rotation.

As such, the unit pulse taught by Fertner is not equivalent to the pilot tones transmitted within the DMT frames used for the timing offset estimation as claimed by the present invention. Fertner teaches away from the present invention by suggesting the use of a unit pulse to determine time domain equalizer coefficients for an equalizer.

For the reasons cited above, Applicant believes that independent claim 1 is patentable over Ogami (U.S. Patent No. 6,430,171) in view of Fertner (6,185,251) and is believed to be in condition for allowance.

Claims 2-4 and 8 dependent are upon claim 1, and are therefore allowable as a matter of law.

Claim 12 is similar to claim 1. For the reasons cited above with regard to claim 1, claim 12 is believed to be in condition for allowance. Claim 13 is dependent upon claim 12 and is therefore allowable as a matter of law.

Claim 17 is similar to claim 1. For the reasons cited above with regard to claim 1, claim 17 is believed to be in condition for allowance. Claims 18-20 are dependent upon claim 17 and are therefore allowable as a matter of law.

Claim 30 is similar to claim 1. For the reasons cited above with regard to claim 1, claim 30 is believed to be in condition for allowance. Claims 31-33 and 37 are dependent upon claim 30 and are therefore allowable as a matter of law.

Claim 41 is similar to claim 1. For the reasons cited above with regard to claim 1, claim 41 is believed to be in condition for allowance. Claim 42 is dependent upon claim 41 and is therefore allowable as a matter of law.

Claim 46 is similar to claim 1. For the reasons cited above with regard to claim 1, claim 46 is believed to be in condition for allowance. Claims 47-49 are dependent upon claim 46 and are therefore allowable as a matter of law.

If the Office is not fully persuaded as to the merits of Applicant's position, or if an Examiner's Amendment would place the pending claims in condition for allowance, a telephone call to the undersigned at (727) 507-8558 is requested.

Very respectfully,

SMITH & HOPEN

By: _____

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Dated: July 15, 2003

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CERTIFICATE OF FACSIMILE TRANSMISSION
(37 C.F.R. 1.8(a))

I HEREBY CERTIFY that this Amendment C is being transmitted by facsimile to the United States Patent and Trademark Office, Art Unit 2631, Attn.: Khai Tran, (703) 872-9314 on July 15, 2003.

Dated: July 15, 2003

Deborah Preza